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EDITORIAL

THE RAPE OF THE RADIO

FREEDOM of the press does not extend to printed matter on patent medicine labels. Our anemic Pure Food and Drugs Act has, at least, that grain of jurisdiction. Advertising matter, away from the package, has, however, all the freedom in the world—and particularly that which is broadcast over the radio.

As yet, the only factors which have the power to exercise a kind of a remote control over air-borne advertising are the Federal Commission and the consciences, *if any,* of the licensed broadcasters.

In either case, very little has been done to curb the vicious and damaging broadcasting done by purveyors of medical quackeries and of dietary chatter and chaff.

At the outset, let it be admitted that the radio's greatest blessing is its turn-it-offness. One who is nauseated by any particular ravelength, may, with trenchant glee, twist the dial elsewhere—or click the switch—or even cast the set back-yardward.

No indeed—one does not *have* to tune in on any station, any more than one has to—to a *movie* go, to see and hear the Hollywood hokum—any more than one *has* to imbibe in fluid phenol or any other potent poison.

The only difference is that Hollywood does have its Hays—under whose well-paid eye—the horrors of colossaldom are not nearly as horrible as they were in their Hay-less hey-day. So are the "movies" kept fairly straight!

Then, thanks to the law, poisons are not so accessible as once they were—not nearly so available to the would-be or the would-make dead. So are the poisons watched!

But there is neither curb nor law to regulate the radio. For proper pay anyone may use—or anyone abuse it. And that which is worth-while on the ether is ruined by its contemptible company.

Quackeries, too rank, to find a place in public print, godiva through the air with a crudeness and a rudeness unashamed.

From New York—directly from the editorial offices of the Journal of Living (sic!) comes a jerky voiced crusader waging a strictly impersonal (!) fight on catharsis. Gobs of staccato-stuff are spilled on the ether—by the editor himself—who is the avowed enemy of the "blasting, corroding, dynamite dissemblers of the 30 feet of the delicate membrane called guts"—and who is the friend—*disinterested* friend "passionately and devoutly positive of the value"—of a product which sounds like *Saratan*—and which absolutely corrects "food delay"; and all the diseases, maladjustments, disasters, inconveniences, despairs and discomforts appertaining thereto! Says he, "Slim yourself with saratan!"

He is as voluble as a victrola, as suave as sleet and as accurate as an almanac—but he is as positive as death itself.

And there are thousands who do listen to this self-labelled expert, who answers all queries in all the fields of medicine, and whose measly ministry cannot help but do damage.

But he *does* sell *Saratan*—else his broadcasting would long since have ceased!

Or—if you dial a Philadelphia station,—licensed to a great store that prides itself upon the quality of its merchandise and the purity of its food, you may listen in—as thousands do—you may listen to the Voice of Health—and so postpone your funeral!

A marmalady voice—obviously spread to cover the crust—comes slowly and funereally, like the sound of a great amen—seeping unwillingly through a reluctant ether. But when it does come, it comes not as a viscid jell, in thuds or gobs, but like a gentle, molten unguent teasing the ear drums to let a passage through.

Listen! "Would you have your blood vessels whitewashed inside?" or "would you rather keep them young, tensile and elastic?" "Do you want to spend your old age hearkening to the tune of cracking arteries?"

For youth's sake—says the basso profundo—for pity's sake—(and especially for *my* pocketbook's sake, which he does not say) take Mar-min and keep your alkaline balance. Mar-min, by the way

is an essence of sea-vegetables containing 200 times as much iron as liver (!), 1000 times as much iodine as fish (poor fish)—yet Marmin is not a medicine—but a food!

And the intelligent can only pity the poor pilgrims who pay their precious tribute to charlatans so crass!

Then there is horse medicine, glauber salt, gone crazy—though not half so crazy as the dolts who pay their dollars for a paltry pennysworth of common crystals. Yet Texas mineral crystals and Crazy crystals—with their droning hill-billy barkers—are not nearly so offensive and blatant as the afore-mentioned pseudo-scientists who slime the air with their verbal sewage.

. . . . . .

And I wonder in this connection, at the near futility of the great attempt of the American Medical Association to make the public, medicine-wise.

Does *"Hygeia"* reach its destination—or would an almanac serve better? Are our sincere crusaders for truth—for intelligence in public health—waging a truly organized war?

Can the ether be policed? And assuming that our American stations be eventually controlled, what would prevent stations on nearby foreign soil from accepting the same, slimy subsidy?

Truly these are problems!

But they are problems that must be faced! The rape of the radio must cease,—and those Government officials who, with their proposed new Food and Drug Legislation, aim to correct these conditions, deserve the support of all who believe in simple decency and in truth.

IVOR GRIFFITH.

The Chemist's Soliloquy

Soon I'll be gone to rust
But I'll be back again,
As wind-borne fertile dust
Or solved in Summer rain;
Then will I be a boon
To lowly grass and grain,
My molecules in tune
With Nature's round refrain.—
And I'll admit it, if I must,
I'll please my God much more as dust.

I. G.

ORIGINAL ARTICLES

KEEPING THE FAITH*

By Dean Edward Spease

MR. PRESIDENT, TRUSTEES, FACULTY, ALUMNI, CANDIDATES FOR DEGREES, PARENTS, FRIENDS OF THE PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE:

IT WAS with no small amount of pride not unmingled with some of trepidation that I accepted your invitation to be the Commencement speaker at this, the 114th Commencement of the oldest school of pharmacy in America.

The subject I have chosen for these remarks is one which, to my mind, typifies the spirit of the Philadelphia College of Pharmacy and Science. The sincere loyalty your faculty and graduates have displayed toward the College at all times, amounting almost to a reverence, is something that cannot go unnoticed and has often been favorably commented upon. It has served as an inspiration and ideal to other workers in our field and there are none who have not been influenced by it. Why is this so? The answer is readily found by reading the history of the College, which happily is in print and available and which reading will prove to all unprejudiced minds that the College has kept the faith and ever tried to follow the ideals of its founders.

It is truly remarkable that a college, which for many years was devoted to one calling, could not only exist, but grow and accomplish what it has accomplished and do it by its own efforts without having to draw upon or be known by the reputation or works of a surrounding university.

Truly it has kept the faith.

There are two ready sources of material from which to compose such remarks as I may make to you today; the one chosen from similar addresses made before, and I have listened to many—educators, professional men and women, ambassadors from foreign countries in scarlet and other gay-colored robes, statesmen and politicians, and business men and women; the other may be chosen

*Address delivered at the 114th Commencement of the Philadelphia College of Pharmacy and Science.

from the experiences, ideals and faith of the speaker. I have chosen the latter because I am speaking primarily to graduates and am not here for "an ostentatious display of erudition" as Remington phrased it, for the benefit of faculty and guests.

May I pause to compliment you upon what may seem to some as a digression from the original purpose of your founders. I refer to the amendment to your charter which embraced the word science, and which, to my mind, is surely an evidence of healthy growth. It will serve a dual purpose which undoubtedly many of you have already noted. If one is to become a successful pharmacist, professionally, he must be acquainted with the fields covered in the allied sciences and be familiar with progress made in those fields; on the other hand, if one is to choose a specialty in chemistry, biology, bacteriology or any of what we pharmacists call allied sciences, one in turn must be familiar with fields allied with his.

Universities have recognized this and have, only of late years, begun the orientation courses in science for liberal arts students. The Mathematician explains the struggle to make education truly liberal has been an interesting one, but at the same time it is to be deplored that the study of history, the classics and language has often been neglected for purely vocational aims. A well rounded education should contain something from all and the specialist will be better for having had this foundation.

It is sad to meet a young man who has had all the offered courses in chemistry in any given institution, who has been granted the doctor of philosophy degree and who has never studied nor read philosophy, logic, ethics, psychology, nor, it would appear, even English.

My duties in recent years have thrown me among workers from all the medical sciences and I find that a knowledge of the functions of these workers and what each field covers is almost indispensable to a proper practice of pharmacy. So I say to you graduates, both of pharmacy and of the allied sciences, try to enlarge your scope of knowledge. May I also add that you must at the same time learn to play. Play will prevent your perspective from becoming warped and narrow. The English have learned the meaning of "being a good sport" and that it really applies to living as well as to the immediate game.

I hope you will not misjudge me if, in these remarks, I sound too frequently the personal note for it must be from personal experiences and thinking that I can voice some speculation as to the future of pharmacy.

I have already referred to some of the steps your College has made looking to the future. These steps have given many of us food for thought and perhaps have inspired us to attempt new things. You have laid the groundwork and are equipping men to work with pharmacists in the field of public health and welfare. You undoubtedly will develop new avenues of approach. May I add, in a spirit of pure facetiousness, that it will not be long before some earnest soul will urge you to include the field of social sciences in your curriculum. Of the merits of this move I can not be the judge because my early experiences have not fitted me to go much beyond the Bible when it says, "for ye have the poor always with you" (Matth. XXVI, 11), and it is not within my ken to know what caused us to have them or what to do about it. If you should give this subject consideration I should like to be present as an auditor.

These are interesting times and there is much talk about unemployment, yet no young man should have a feeling of futility. He should, on the contrary, consider that he has an opportunity to do new and original things. These times have seen change in government, in business, in all of the professions, and pharmacy must expect to be affected, too.

Changes in pharmacy have come about and who cares about the reasons, except in so far as they may govern thinking for the future. It is said that prescription writing is decreasing—is this really so or has it rather become centered particularly among those most capable of understanding the new physician's needs?

Josiah K. Lilly recently said, "The march of American medicine from empiricism into the scientific phase has progressed with increasing velocity for over a hundred years. Scientific advance in the profession of pharmacy as the handmaid of medicine, in the United States, may be dated from the issuance of the first United States Pharmacopœia in 1820, and the establishment of the first school of pharmacy, in Philadelphia, in 1821." We can safely add that this velocity has become accelerated during the past ten years.

Some have deplored what they term the inroads of the pharmaceutical manufacturers into the field of retail pharmacy and the de-

velopment of so-called prescription specialties. Is not this exactly what we have urged upon pharmacists for ages as their function—to develop medication? If you will think clearly and divide these manufacturers into two great classes it will make the going easier. On the one hand we have the group of manufacturers who maintain research staffs and research laboratories. Some of your graduates will join these staffs. On the other hand, we have a very large number of nothing more than imitators, those who imitate every scientific step taken by the first group, who fatten upon the empiricism still extant in medicine, who imitate pharmacopœial and formulary preparations and who still associate each drug with a given disease. Our schools and our graduates need to be able to classify manufacturers and lend their support to the first group and place the second group in the limbo of the undesirable things of life—with the nostrum makers. To the prospective pharmacists may I add that our good manufacturers have greater facilities for doing research and for being real producers than has any individual but they never can have the same personal interest in the practicing physician and his patient that you can have—yours is a personal professional service. Seize upon it and keep the faith.

To render the best service you must always be a student of your own art and of the allied sciences that fit you to practice it. You must keep abreast of the times and read other literature as well as pharmaceutical. You must learn modern medical thought and endeavor and you must know what has brought about the trend toward hospitalization.

Just what our part in this new method of handling the sick and in the new teaching of medical students and nurses may be is not yet entirely clear, but thinking and experimentation may show us what the pharmacist of the future will be. Certain it is that we cannot be professional either in fact, nor thought to be by others unless we forsake the field of empiricism and nostrums.

If you will but read the history of this College, you will learn how nostrums gained a foothold in this country, and how then, even as now, they have been and are the big thorn in the side of pharmacy.

Empiricism and nostrums go back to very ancient times and are still with us in force and will still be with us for ages to come, but it is the duty of the educated and trained pharmacist to assume a militant attitude against them. We must keep the faith.

It may not be too much of a digression for the sake of new graduates in pharmacy and allied sciences for me to point out to you that many opportunities will come to you to assume the role of teachers. The public, because of radio and other forms of advertising, have become both food and drug conscious. You are the ones to help them chart their course.

You can do this by reading a few good books, by giving their contents careful thought, and by making a close contact with some thinking clinician or teacher of medicine. Let me recommend the history of your school, read with the thought in mind of the ideals of its forefathers and how it has kept abreast of the times through the years, the little book "Mystery, Magic and Medicine," by Haggard, LaWall's "Four Thousand Years of Pharmacy" and a careful reading of recent medical literature. Then go out upon every occasion and teach the public, quoting examples of scientific medicines, empirical medicines and nostrums. Show them pharmacy's relationship to all three, the bad with the good. Explain proprietary medication and seize such opportunities as the present attempted revision of the Pure Food and Drugs Act to set yourself firmly and publicly upon the side of right and for better public health.

I am well acquainted with one pharmacist and teacher who realized there was some underlying principle of therapy that had eluded him and started out to find it. His path was not an easy one but he has persisted and has learned many things and has at least the satisfaction of beginning to have a clear perspective.

His first question to be answered was, why are physicians and nurses taught in hospitals and his second, can this be the place where the pharmacist, too, must begin!

Once behind hospital walls with the privilege of investigation and with the association of clinical teachers he has learned what is meant by rational therapy, how medical students are being taught and why, and he can see clearly where the pharmacist fits in and has learned that a pharmacist must be familiar with medical thought and philosophy of therapy as well as with pharmaceutical technique.

From the experience gained by observing the effect of the pendulum swing, from old-fashioned therapeutics over to the extreme phase of therapeutic nihilism, one can begin to see where the professional pharmacist of the future should fit in.

The physician of tomorrow must lean upon the pharmacist for his knowledge of drugs and the pharmacist must have a scientific reason for each drug that he offers. It begins to be clear that medical teaching has, either intentionally or unintentionally, provided a place for the pharmacist and he must immediately fit himself for that place.

I predict that ere long every prospective pharmacist who expects to practice his profession will serve an interneship in hospital pharmacy after graduation. I do not expect this to become a legal requirement nor is it desirable to have it so, but I believe firmly it is the only way he can practice shoulder to shoulder with the healer of the sick. How knowledge gained in this way can be transmitted to pharmacists already in practice is the same problem that medicine is trying to solve through series of post-graduate lectures and clinics, in hospital and in meeting places of county societies.

I do not view the practice of pharmacy within a hospital as a definite detached specialty separate and apart from the general field of pharmacy. There are some parts of it which the pharmacist outside may never have to practice but the major portion of what he learns is useful and essential to outside practice. If he starts as an interne, living with physician internes, subject to the same rules and regulations and gradually becomes familiar with their thoughts, speculations and medical philosophy, he will know how and what they have been taught and doubtless the reason why as well. He cannot help becoming a sought-for pharmacist when he goes outside and he surely will be able to mingle with physicians and work with them in daily practice. The display of his interneship certificate beside his diploma and license will not be without value.

To sum it all up, we, as pharmacists, have held ourselves aloof, either from a feeling of inferiority or from a lack of real knowledge, and it is time that we face the facts and secure the general knowledge of things medical that we need.

Pharmacology, along with pharmacy, has been experiencing its vicissitudes. It has assumed oftentimes that it could leave pharmacy out of the picture but happily water seeks its level in the end and as truly as pharmacists need to know pharmacology and its underlying principles, so does pharmacology need to ally itself again with pharmacy.

I wish to quote from a recent paper delivered by a clinician, Dr. Joseph M. Hayman, Jr., read before the 1936 meeting of the Asso-

ciation of American Medical Colleges. It will crystallize some of the thoughts about modern therapy I have been endeavoring to present to you. "The pharmacological knowledge of too many students seems confined to linking a certain disease with a particular drug, whose proper dose has been jotted down in a notebook carefully carried in the pocket. This is not pharmacology. Pharmacological knowledge must be based on an understanding of the alterations in normal or abnormal physiological processes which can be produced by the introduction of substances into the body. Except for directly parasitotropic agents, the student should realize that every time he gives a 'drug' he is attempting to modify some physiological process, that the only way he can be sure that he has succeeded is by observing such a change; that the 'dose' is the quantity required to produce this change—unless prevented by the development of toxic symptoms. The only way by which such a conception can be instilled is to give the student the opportunity to observe such changes in experimental animals and in man. In man the reactions are so complex and observation so extraordinarily difficult that unless the student has had training in making such observations himself on animals in the laboratory, he usually is completely befogged by his human experiment and falls back on the comfortable (if the patient lives) or otherwise uncomfortable post hoc ergo propter hoc.

"The goal should be to train the student so that when he is faced with a problem on the ward, he will make his diagnosis, so far as possible, in terms of disordered physiological processes, and will then ask himself what pharmacological agents are at his command which might be expected to modify these processes. This accords with Dr. Lamson's suggestion for a classification of drugs primarily on a basis of the tissues on which they act. But the student must have more than this. When he contemplates the use of a particular drug for a specific purpose, all the other actions of this chemical in the body must flash across his mind, so that before deciding on its use he may balance the desired beneficial effect against the possible untoward or undesirable actions.

"This, I confess, sounds like a large order. It is. It is more than can be expected from even the best single second-year course. The formal course can but lay the groundwork, giving the opportunity for observation and measurement of the effect of important drugs on the various organs of normal animals wherever possible,

supplemented with discussion and description of other drugs where individual experiment is impractical.

"There are, of course, many drugs of proven value whose therapeutic action it is impractical to demonstrate in the laboratory. But this does not detract from the necessity of teaching and demonstrating that drugs exert their effect in a measurable way, usually on certain organs or tissues to the relative exclusion of others. A remedy whose effect cannot be measured under proper conditions is generally valueless. Yet here, perhaps, a word of caution is necessary, for while it is by demonstrable effect that the therapeutic wheat is separated from the chaff, there may be a few grains among the chaff which, because of the crudeness of our methods, we are unable to find."

Time will not permit much further quotation from this admirable paper, still I wish to quote two other passages which are not germane to my subject but which do convey welcome words to pharmacists' ears.

"A working, not hearsay acquaintance with the United States Pharmacopœia, the National Formulary and New and Nonofficial Remedies is an adequate defense against even the most skillful detail man" and "There is, I believe, a distinct advantage in having prescription writing taught by a man who has had experience in having his prescriptions filled, or by one who has some behind-the-counter acquaintance with pharmacy."

These quotations come from an associate professor of medicine with whom it has been my privilege and joy to work for several years.

Our own experiment, while it has proven many facts to those of us who have watched its working, is still an experiment in the minds of many lay educators and hospital administrators because of their unfamiliarity with it.

It may be sketched briefly to you so you may get a grasp upon how it has worked. I have called it an experiment because it was not a plan developed a priori and then put into effect, but it was an experiment here and another there until today it begins to appear as a program. One important observation seems to be its adaptability and the fact that practicing pharmacists and hospitals will find it useful even in localities where a school of pharmacy does not exist.

Our School, a part of a University, which, too, is unnecessary to the adoption of such a program, and indeed I do not believe it

necessary nor even desirable for all schools of pharmacy to adopt such a program, though each school in these days should have a definite objective, is a part of our health group. This group includes medicine, pharmacy, nursing, dentistry, the School of Applied Social Sciences and the hospitals. Our School has an agreement with the hospitals similar to the one between the School of Medicine and the hospitals, whereby it assumes responsibility for the pharmacy within the hospitals and its staff are actual members of our teaching force. The agreement provides for a Pharmacy Committee, made up, in our case, of an assistant professor of surgery, as chairman, the associate professor of medicine, the associate professor of obstetrics, the associate professor of pediatrics, a senior clinical instructor in medicine, the pharmacist, as secretary, and the directing pharmacist, who is head of the Department of Pharmacy within the School.

This committee meets regularly, reports its recommendations to the medical governing board and when necessary, through it, to the trustees. Last year it discussed sixty-one items such as suspected ampuls, some sub-standard drugs, narcotic regulations, intramuscular medication, hypodermic syringes and needles, syringe sterilization and similar questions concerning medication, methods of use, and certain of the professional supplies. Professional supplies have been placed in the pharmacy and under the jurisdiction of the committee during the past year.

A drug policy was formulated and approved which definitely states that the pharmacopœia of our hospital consists of the United States Pharmacopœia, National Formulary and New and Nonofficial Remedies and that our formulary is supplementary to these for the purpose of listing sizes and kinds of available medication and for "convenience in ordering and prescribing." The policy provides for drugs for research. We stock only items from our pharmacopœia.

The pharmacy has as its functions supervision and responsibility for all medication, routine, ward and division, private patient, emergency, antidote, narcotic and special forms. It prepares all solutions, both utility and sterile, and dyes for diagnosis. It supervises purchase of medication and of all professional supplies and makes periodic inspections of all drug cabinets on the floors. It prepares all laboratory reagents for teaching purposes and looks after certain forms of laboratory equipment.

In our case, bulk manufacturing and control, with development of special formulae and research, are largely done in the School laboratories.

Each pharmacist is put in charge of certain functions and much of such service is rotated.

A year ago a resident pharmacist was added who lives with the resident physicians and internes and has the same status.

This spring a number of other hospitals have offered us internships in pharmacy as they realize the value of proper twenty-four hour pharmaceutical service. These internes are graduate registered pharmacists. When possible the lower grades of unregistered help are confined to prospective or interim students.

In addition to experience in bulk manufacturing which any student may elect, two hospital courses under the supervision of the pharmacist are available. The one for all students consists largely of lectures and demonstrations, some from medical and some from lay departments, with the purpose of delineating hospitals and hospital pharmacy, and the other for permitted seniors where they serve actual time in the pharmacy and professional stores and work upon individual problems of the type which frequently face the pharmacist. It makes it easy to select internes from this group.

We were visited a year ago by a representative of the American College of Surgeons. This has resulted in the reading of a paper before their San Francisco Clinical Congress and its subsequent publication in the Journal of the American Pharmaceutical Association for January, 1936, and the Bulletin of the American College of Surgeons for March, 1936, upon the requirements for a hospital pharmacy.

A similar paper appeared in the June number of Hospitals of the American Hospital Association. A committee has been appointed by the American Hospital Association to study requirements for hospital pharmacy and it is hoped that standards will be promulgated and adopted and that the pharmacy will soon be included in the list of items necessary to approval of a hospital. These papers are intended to herald and advance the idea and part of the responsibility or credit for their being prepared goes quite naturally to E. Fullerton Cook.

He it is, too, who has vainly tried to develop a Committee on Pharmaceutical Practice within the American Pharmaceutical Asso-

ciation and because of his efforts to have the profession do its own house cleaning he may find himself in a favorable position when such a thing is really done.

Perusal of the articles referred to above will show that we have not forgotten the practicing pharmacist but that this entire program has been in the nature of an experiment to help him and an experiment that has brought good results for others as well as for him.

Our staff, like yours, is constantly making talks to outside groups upon pharmacy, upon subjects portraying the romance within its history, and upon the futility of self-medication and it is certainly true that some good results can now be observed from these talks.

May I congratulate you graduates, both of pharmacy and of allied scences, that you are entering upon a world when you can have a voice in its development. Take your place in civic affairs as well as in your science. You have had the "working tools" placed in your hands—will you use them for the good of mankind or will you look only to the profits? None can predict—none can tell—but I do know that happiness and satisfaction can come only to him who "Keeps the Faith."

May you be able to say with the poet in his

"An Instant of Retrospection"
So many happy hours have been
Along my slight career,
That while I'm sitting calmly in
The deep'ning twilight here
I somehow feel a quick regret,
A sudden throb of pain,
A thought that makes my lashes wet—
That naught can come again."

—G. H. S.

A BIBLICAL ADVENTURE IN PHARMACOLOGY

By David I. Macht, M. D., Phar. D., Litt. D.

Pharmacological Research Laboratory, Hynson, Westcott & Dunning, Inc., Baltimore, Md.

THE second half of the eighteenth verse of Psalm CIX is of interest not only to the student of the Bible but also to the scientist as it has been the starting-point of an important pharmacological research leading to valuable practical conclusions. In the Authorized Version this passage reads as follows: "So let it come into his bowels like water, and like oil into his bones." In Leeser's translation we find a different rendering, "And it is come into his inward parts like water and like oil into his bones." It is evident that the term for bones is used metaphorically for members of the body. This idea is well expressed in Mendelsohn's German translation of the verse, *Er dringe in sein Innerstes wie Wasser, wie Salbe in seine Glieder* (Compare Psalm XXXV, 10: "Let all my bones proclaim, Lord, who is like Thee?") The rabbis used this passage to support the traditional *halacha,* "law," mentioned in the Tractate (Sabbath 86a), which states that anointing the body with oil on *Yom Kippur,* the day of atonement, is placed in the same category as taking water by mouth. Just as water is absorbed from the stomach and intestines, so is oil, applied to the surface of the body, absorbed into the tissues (maquish *sikha* li-*she-thiyah*).

One of our great pharmacological problems, particularly in relation to the treatment of skin diseases, is to find a suitable vehicle for applying medicaments to the skin so that they will penetrate the different layers of the integument and, if possible, pass through the deeper structures of the body. For this purpose, drugs are usually incorporated in oils or fats in the form of lotions or salves. In order to determine what oils or fats constitute the most suitable vehicles, I have undertaken an experimental investigation of the reactions of animals to which they were successively applied.

From the standpoint of pharmaceutical chemistry, oils or fats are divided into two principal groups; the fixed oils, or *olea pinguia,* and volatile oils, or *olea volatilia,* which are sometimes called essential or ethereal oils. To the first class belong such substances as olive oil, rapeseed oil, cocoanut oil, linseed oil, palm oil, castor oil, lard oil, sperm oil, etc., some of which are liquid while others are solid at room temperature. To the second class belongs a large number of aromatic oils of plant origin.

I have incorporated potent drug principles, such as alkaloids, strychnine, cocaine, antiseptics, etc., in various fixed oils and fats, i. e., in olive oil, petrolatum, lard, spermaceti and lanolin. The oils impregnated with these principles were then applied to the shaven skin of rats, guinea pigs and rabbits. The pharmacological reactions of the test animals, carefully studied, determined the degree and rapidity of absorption. In this way it was found that none of the heavy fixed oils and fats penetrated deeply when applied to the epidermis or outer layer of the skin. It was true that wool fat appeared to be more penetrative than the other substances compared but, on the whole, the results of the experiments performed were very disappointing and the fixed oils and fats exhibited little penetrability when applied to the intact skin.

After much futile experimentation, a new method of approach was suggested to the writer by the passage quoted above. "Even as water taken into the stomach is absorbed by the tissues, so certain oils", when applied to the integument, "are absorbed into the 'bones' " —that is, "the inner tissues of the body." It is well known that the ancients used oils and fats extensively for medicinal purposes and also as cosmetics. It is also common knowledge that such oils and fats were generally perfumed, that is, mixed with various aromatic oils and other substances. Modern scientific investigation has corroborated the historical fact that many of these aromatic or essential oils, combined with resins and balsams, were used effectively for embalming and preserving animal tissues. Many of the volatile oils are definitely antiseptic. They could produce a preservative or antiseptic effect only insofar as they penetrated and were distributed through the tissues. For this reason, I thought it well to investigate the penetrability of various volatile oils and determine whether or not they pass through the skin into the different tissues and are absorbed into the blood. The oils investigated were oil of pine, oil of juniper, oil of betula, oil of anise, oil of thyme, oil of caraway, oil of fennel, oil of peppermint, oil of spearmint, oil of wintergreen, oil of cloves, oil of rosemary, oil of eucalyptus, oil of geranium, oil of bergamot, oil of orange, oil of lemon, oil of lavender, oil of sassafras, oil of nutmeg, oil of roses, oil of cinnamon and oil of cassia.

The experiments were made on mice and rats. A small quantity of a given oil was applied directly to the skin of the back and abdomen of mice. In the rat experiments, the oil was applied in some

cases to the shaved and, in others, to the unshaved skin. Care was taken to keep the animals from licking the treated surfaces and absorbing the oils through the mouth.

The results obtained were remarkable. That the volatile oils were quickly absorbed was definitely proved by the physiological and pharmacological symptoms which followed their application. All the oils produced in the animals first a primary excitation, then convulsions and, finally, unconsciousness of a degree entirely dependent on the dosage and kind of oil employed. In most of the small animals death ensued at various periods thereafter.

The volatile oils enumerated above are very complicated in their chemical composition and very different from the fixed oils, which consist chiefly of hydrocarbons. The essential oils contain terpenes, aromatic alcohols or phenols, ketones, esters and other complicated organic compounds of both the saturated and unsaturated series of chemicals. Experiments with samples of some of these pure chemicals, i. e., with pinene, phellandrene, limonene, dipentene, cineol, eugenol, anethol and eucalyptol, revealed that they were speedily absorbed through the intact skin and produced poisoning, even when applied in minute quantities, more rapidly than the volatile oils themselves.

These studies with the essential oils, on the one hand, and a number of their individual chemical constituents, on the other, were but the preliminary to a much more extensive and intensive investigation regarding the possibility of employing some of their number as vehicles for carrying other medical agents through the integument into the deeper lying tissues of the skin and conveying them finally to the lymphatics and blood vessels. The results of such an investigation, which is in progress, will be reported in due time. For the present, however, it has been definitely established that volatile oils, and many of their individual chemical constituents, possess a high power of penetration through the skin. This finding throws light on the successful use, from the days of antiquity until now, of balsams and oils in the treatment of wounds and infections, as well as for the preservation of animal tissues. It is also of interest when considered in connection with the rationale of some therapeutic practices still extant and never fully understood. Oil of turpentine, for instance, is a household remedy as well as an official drug recommended for both external and internal administration. Externally, it is still ex-

tensively used in the form of stupes or compresses applied to the abdomen for the relief of meteorism or gaseous distension of the intestine. In such cases, turpentine is generally supposed to exert a counterirritative effect. As a matter of fact, experiments which I have made with oil of turpentine on mice and rats have revealed that the drug, when applied to the intact and unshaven skin, is rapidly absorbed and produces systemic poisoning, namely, excitement, convulsions, coma and death. External applications of oil of turpentine therefore not only act as a counterirritant but are followed by sufficient absorption of the drug to produce a carminative effect on the gastrointestinal tract.

The present paper is intended to call attention to the pharmacological interest of volatile oils, which constitute a field hitherto practically unexplored, and to demonstrate that the verse quoted from the Psalms, not only figuratively but literally and scientifically correct, was the starting-point of an important experimental investigation.

Water and Light

Water exhibits the power of absorbing light. Whipple states "Quiescent pure water transmits about 47 per cent. of the solar energy through the first meter of depth, 80 per cent. of the remaining energy through the one to two meter stratum, and over 90 per cent. through all deeper one-meter strata, the loss per meter rapidly declining to a minimum of about 2 per cent. of the energy incident on the upper surface of the stratum." It is to be noted that the amount of light absorbed increases as the suspended materials in the water increases. Green organisms need light in order to perform their life functions and hence are found in the upper layers. Certain organisms react negatively to light and seek the lower regions.

Living organisms must have enough of the right kind of food to grow and reproduce properly. Microscopic plant forms need, among other things, water, carbon dioxide, the chemical elements, nitrogen, phosphorus, sulphur, magnesium, calcium, potassium and iron in the form of available nitrates, phosphates and sulphates.

This light-absorbing property of water may be a very cogent explanation of a most obstinate belief among the "untutored" that natural water is much healthier than the treated waters of municipalities.

OFFICIAL BIOLOGICAL PRODUCTS AND THE OFFICIAL PREPARATIONS FOR PARENTERAL ADMINISTRATION

By Louis Gershenfeld, Ph. M., B. Sc., P. D.

Professor of Bacteriology and Hygiene, Philadelphia College of Pharmacy and Science

BIOLOGIC therapy as now practised embraces the prophylaxis and treatment of disease by agents marketed under the heading of "Biological Products". The latter includes many preparations which are of a complex biological nature and this designation serves as a convenient classification to differentiate such products from the mineral and vegetable groups in our materia medica.

In the U. S. P. X, the following biological products were official: 1. Antitoxinum Diphthericum (Diphtheria Antitoxin); 2. Antitoxinum Tetanicum (Tetanus Antitoxin) and 2 (a) Antitoxinum Tetanicum Crudum (Crude Tetanus Antitoxin); and 3. Vaccinum Variolæ (Smallpox Vaccine). The Crude Tetanus Antitoxin was deleted but the other three preparations were retained and are official in the new revision. In addition to these three the following ten (making thirteen in all) biological products are now official in U. S. P. XI. 4. Antitoxinum Scarlatinæ Streptococcicum (Scarlet Fever Antitoxin); 5. Serum Antimeningococcicum (Antimeningococcic Serum); 6. Serum Antipneumococcicum-I (Antipneumococcic Serum, Type I); 7. Toxinum Diphthericum Detoxicatum (Diphtheria Toxoid); 8. Toxinum Diphthericum Diagnosticum (Diphtheria Toxin for the Schick Test); 9. Toxinum Scarlatinæ Streptococcicum (Scarlet Fever Streptococcus Toxin); 10. Tuberculinum Pristinum (Old Tuberculin); 11. Vaccinum Rabies (Rabies Vaccine); 12. Vaccinum Typhosum (Bacterial Vaccine made from the Typhoid Bacillus); and 13. Vaccinum Typho-paratyphosum (Bacterial Vaccine made from the Typhoid Bacillus and Paratyphoid "A" and "B" Bacilli).

Pharmacopœial requirements are employed at all times as the guides for standards of purity and potency by governmental agencies in the enforcement of the Pure Food and Drugs Act. However it is of sufficient import to note that all of the biological products official in U. S. P. XI must conform to the requirements and standards as set forth by the National Institute of Health and pharmacopœial com-

mittees cannot overrule the latter. Due to the limitation of space, only the high lights concerning each of the above-mentioned preparations can be given here.

Antitoxins in U. S. P. XI

You are all familiar with the value of diphtheria antitoxin in the treatment of diphtheria. As in the case of all antitoxins and antibacterial serums a reduction of mortality results if this preparation is used in large enough dosage and as quickly as possible after the symptoms of the disease appear. Diphtheria antitoxin may also be employed as a temporary preventive remedy against diphtheria by administering subcutaneously 1000 units of this preparation. This is but a temporary protection which lasts for a period of from two to four weeks.

Numerous favorable reports have appeared regarding the use and value of scarlet fever antitoxin as a specific curative agent, and it has been found to be more effective than convalescent human serum. Though suggested as an emergency measure for the temporary (passive) immunization of contacts who are Dick positive in doses of from 2000 to 2500 units, Park and others employ active immunization instead by using the toxin, as the response is very quick. Extensive use of tetanus antitoxin has demonstrated fully its value as a prophylactic or preventive agent. A prophylactic dose of 1500 units is given subcutaneously as soon as possible after the occurrence of wounds especially where there has been laceration or crushing of tissue or puncture, and especially if dirt or soil has penetrated. If in rare cases the wound has not healed sufficiently, weekly injections of 1500 units of antitoxin are given until the wound is practically healed. Tetanus antitoxin in the treatment of developed tetanus does not appear to have any distinct aid. Further investigation is needed to determine whether this product possesses any definite curative value.

Antibacterial Serums

Great success appears to have attended the use of antimeningococcus serum when properly used; and the type-specific serium official in U. S. P. XI and employed as a therapeutic agent in infections by pneumococcus type I is said to be responsible for a reduction of a high percentage of the case fatality rate of type I pneumococcus pneumonia.

Toxins and Toxoids

Scarlet fever streptococcus toxin properly diluted with suitable diluent so that a skin-test dose is contained in each 0.1 cc. of marketable product is employed in the Dick Test. In a series of suitable dosage scarlet fever streptococcus toxin is employed in active immunization in the preventive treatment of scarlet fever. Substantial evidence is available indicating that prophylactic immunization with this preparation if properly carried out will confer an adequate protection, and is a valuable method for the reduction of the incidence of scarlet fever. Diphtheria Toxin for the Schick Test is employed in the Schick test to determine whether one is immune to diphtheria. Diphtheria Toxoid, a detoxicated toxin, is employed as a prophylactic agent in active immunization to obtain a more lasting immunity to diphtheria.

Vaccines

Typhoid vaccine and Typhoid-Paratyphoid "A" and "B" vaccine are bacterial vaccines and the definitions following each of the above titles in the U. S. P. describe these preparations. Immunization against typhoid and paratyphoid fevers is not to be used as a substitute for sanitary measures, but where the latter are not practiced at all or to the degree which they should be or where minor sources of contamination are always possible, antityphoid and antiparatyphoid vaccinations will afford a large degree of protection. The value of such prophylactic therapy has been definitely established. Rabies vaccine is essentially a protective or prophylactic agent. The efficiency of its use in the so-called Pasteur treatment (creating an active immunity) in rabies is no longer problematical. Smallpox vaccine the first biological product employed extensively in practice and first admitted into the U. S. P. in the Ninth Revision is familiar to everyone. The primary value of this preparation is for the prevention of smallpox. Successful vaccination and revaccination (even only once) performed systematically confer complete protection to a community against all forms of smallpox.

Koch's Old Tuberculin is of greatest value as an aid in the diagnosis of tuberculosis in man and animals. It is employed in those techniques which depend upon the development of skin reactions as appear in the intracutaneous test of Mantoux or Mendel; Von Pirquet method (cutaneous test); Moro reaction (percutaneous test); subcutaneous test; and in Calmette's ophthalmic reaction.

U. S. P. Preparations Used Parenterally

There are five preparations official in the present U. S. P. in which the finished product is directed to be sterile. In the case of Sterilized Distilled Water and Physiological Solution of Sodium Chloride specific instructions for their preparation and sterilization are given. Methods of sterilizing the following are not given but they are directed to be sterile: Purified Solution of Liver; Solution of Paratyphoid; and Solution of Posterior Pituitary. In the case of two preparations (Solution of Epinephrine Hydrochloride and Solution of Histamine Phosphate), a statement is not made that the solution must be sterile, though the average dose by parenteral injection is given and a notation is made that a suitable preservative may be added to these solutions. Though these previously named preparations are the only ones official in the new U. S. P. and which are to be sterile and administered parenterally, there are however many products, chemicals, extracts and solutions which even though not so designated can be and are employed in practice for parenteral administration. The following remedial agents official in U. S. P. XI are however listed separately, for under the average dose the amount to be given parenterally is specifically mentioned. Ethyl Chaulmoograte; Arsphenamine; Bismuth and Potassium Tartrate; Caffeine with Sodium Benzoate; Calcium Gluconate; Camphor; Emetine Hydrochloride; Epinephrine; Green Iron and Ammonium Citrates; Mercuric Salicylate; Soluble Iodophthalein; Neoarsphenamine; Phenolsulfonphthalein; Quinine and Urea Hydrochloride; Sodium Thiosulfate; Strophanthin; and Tryparsamide. The following statement under General Notices on page 7 concerning the preservation of solutions for parenteral use is of interest: "For the preservation of solutions of organic substances intended for parenteral administration, there may be added to the solution, unless otherwise directed in the monograph, not more than 0.5 per cent. of chlorobutanol, cresol, phenol, sulfurous acid, sodium bisulfite or other suitable preservative. Not more than 0.85 per cent. of sodium chloride may be present, and the air in the container may be replaced by carbon dioxide or nitrogen. The presence and amount of the preservative shall be plainly declared upon the label of the container in which it is sold or dispensed." Under General Tests on page 469 are to be found specific instructions and tests for determining the sterility of

liquids and on the three preceding pages, there is included a brief consideration of sterilization and sterilization techniques.

Preparation in the National Formulary

There are no biological products official in the National Formulary Sixth Edition, but therein are to be found many preparations employed for parenteral administration. We find included "Redistilled Water" which is also dispensed under the names of Double-distilled Water and Triple-distilled water. In addition there are Isotonic Solution of Dextrose and Sodium Chloride and Solution of Procaine Hydrochloride. Methods of preparation, tests for purity and procedure for sterilization (if intended for parenteral use) for these three preparations are given. A consideration of ampuls is to be found in this new edition. As compared with the fifth edition we find that considerable more details are given concerning the glass to be used for ampuls, the method of cleansing and sterilizing the empty glass ampuls, the preparation of the solutions, the filling and sterilization of the filled ampuls, and the procedure for testing of the finished preparation for sterility. In the National Formulary Fifth Edition there were official the following seven solutions for ampuls: Ampuls of (1) Caffeine with Sodium Benzoate; (2) Camphor; (3) Emetine Hydrochloride; (4) Iodine; (5) Quinine Dihydrochloride; (6) Quinine and Urea Hydrochloride; and (7) Quinine Cacodylate. In the new (Sixth) edition, these seven were retained; and twenty-one additional ampul solutions were added making a total of twenty-eight such preparations. The new twenty-one formulas are: Ampuls of; (8) Redistilled Water; (9) Bismuth Subsalicylate; (10) Calcium Chloride; (11) Calcium Gluconate; (12) Dextrose; (13) Dextrose and Sodium Chloride; (14) Ephedrine Sulfate; (15) Epinephrine Hydrochloride; (16) Green Iron and Ammonium Citrates; (17) Mercuric Salicylate; (18) Mercuric Succinimide; (19) Magnesium Sulfate; (20) Methenamine; (21) Posterior Pituitary; (22) Procaine Hydrochloride; (23) Quinine Hydrochloride and Ethyl Carbamate; (24) Sodium Chloride; (25) Sodium Citrate; (26) Sodium Iodide; (27) Sodium Salicylate; and (28) Sodium Thiosulfate.

The following statement is of interest and very important, as ampuls of solutions of the above mentioned preparations official in the N. F. even though of a different strength must conform to the tests for purity and sterility as given in the National Formulary:

"The strength of the ampul solution or suspension recognized in each monograph is the one most generally used in medicines. However, ampul solutions containing the same ingredient or ingredients but in other concentrations and offered under the monograph names must meet the tests and tolerances (proportionate) of the monograph, and the label of the ampul shall plainly indicate the amount of active medicinal ingredient or ingredients in a stated unit of the solution."

The section on Materials and Preparations for Diagnostic Use is more extensive than in the previous edition. Therein are found the formulas for many and varied diagnostic reagents and clinical test solutions employed in the examination of urine, blood, gastric contents, spinal fluid and other body fluids. Formulas for the many commonly used culture media and bacteriologic and histologic staining solutions are included. This entire section, however, requires careful revision to make it more useful and serve the purpose intended.

Palladium

It appears that a silvery-white, fit companion for gold leaf has at last been found. It is palladium leaf, now produced commercially in this country and in France. Palladium metal is of extraordinary malleability, and may be beaten into sheets only 1/250,000 inch thick. It takes some 35,000 of these, each 3⅜-inch square, to weigh an ounce. This leaf is tarnish-proof and corrosion-proof and of beautiful color. Either alone, or as contrasting metal with gold leaf, it serves the same purposes, as for book edges, lettering, tiling, etc., and for coating leather to be made into "silver" slippers. Sculptors have used it for covering statuary.

The metal palladium is rare, but is less expensive than platinum or gold. It is found in small amounts in the nickel ore at Sudbury, Ontario, and in isolated places pretty well all over the earth. Palladium is high-melting, strong, and remarkably easily worked, a metal well-liked by jewelers and dentists. It makes stronger jewelry than does white gold. Indeed, it alloys with gold to make a markedly superior white gold, which is highly tarnish-resisting as well as very tough. It alloys well with other metals for special applications. In the chemical industry, palladium is notable for its power of occluding hydrogen, which gives it "catalytic" activity. A process has been devised for plating palladium, to form a highly protective coating for food containers, jewelry and reflectors, thus extending the utility of this splendid metal.—(*A. D. Little Bulletin.*)

THE COMPARATIVE ANTIRACHITIC ACTIVITY OF SEVERAL FISH LIVER OILS AND OTHER SOURCES OF VITAMIN D FOR THE CHICKEN AND THE RAT

By A. Black and H. L. Sassaman*

IN 1930 Mussehl and Ackerson (15), and Massengale and Nussmeier (14), reported that there was considerable difference in the ability of the rat and chicken to utilize the vitamin D from irradiated ergosterol. The chicken required many times as much of vitamin D from this source as from cod liver oil. This problem has been extensively studied and the results have been confirmed by Russell and Klein (16), Steenbock, Kletzien and Halpin (18), Bethke, Record, and Kennard (1), and many others.

The early clinical studies, chiefly by Hess, Lewis and Rivkin (10), and Hess and Lewis (11), (12), indicated that the human required about three times as many units of the ergosterol vitamin D as the cod liver oil type. Hess and Lewis (11), also reported that vitamin D in milk, which was produced by feeding irradiated yeast or ergosterol, was only about one-half as active for the human as the D in irradiated milk. Later work by Kramer and Gittleman (13), Wyman, Eley, Brucker and Harris (20), and Gerstenberger, Horesh, Van Horn, Krauss and Bethke (7), indicates that there is little, if any, difference between the two types of vitamin D for the human. It now seems definite, however, that the human responds more like the rat than the chicken to the two kinds of vitamin D.

Comparative chicken and rat experiments have been widely employed to study the different kinds and sources of vitamin D. Waddell (19), made a noteworthy contribution when he demonstrated that irradiated cholesterol contained a vitamin D which was approximately as active as cod liver oil D for the chicken. This work was confirmed by Bethke, Record and Wilder (2). Bills, Massengale and Imboden (4), reported that blue fin tuna liver oil vitamin D was only about one-sixth as active as cod liver oil D for the chick. Dols (6), and Rygh (17), did no find any difference between the tuna and cod liver oil vitamin, but more recently Bills (5), has reported the results of a very extensive study of fish liver oils and found that tuna oils varied between about equal to about one-sixth the activity of cod liver oil, unit per unit. Bethke, Krauss, Record and Wilder (3) and

*Biological Laboratories, E. R. Squibb & Sons, New Brunswick, N. J.

Haman and Steenbock (9), found that the vitamin D in the so-called metabolized vitamin D milk was less than one-tenth as active as that from cod liver oil or irradiated milk for the chick. Bethke, Record and Wilder (2), have recently reported that the vitamin D from irradiated plant products was of the same order of activity for the chickens as irradiated ergosterol, while that from the irradiated animal products closely resembled irradiated cholesterol or cod liver oil D. Recent reports indicate that there are several kinds of vitamin D, and the rat and chicken differ considerably in their ability to utilize them.

Since the discovery of fish liver oils, which are very rich in the vitamins, they are becoming very widely used in medicine, and the relative availability or activity of the vitamins in such oils is of considerable importance. Our present studies were, therefore, undertaken to extend our knowledge concerning such sources of vitamin D. For the most part our samples of fish oils were taken from relative large lots and are representative of the oils of commerce, and, therefore, do not represent oils from strictly selected species.

Experimental

A number of fish liver oils and other products were studied comparatively on the rat and chicken. They were first tested for vitamin D with the rat by the Standard U. S. P. XI method. A standard curve was used to allow more accurate interpretation of the data. Table 1 contains a list of the samples which have been studied and information concerning the source and vitamin D content.

For the chick tests, the prophylactic type of experiment was employed. Single comb white leghorn chicks were used for most of the experiments, although in a few experiments a white leghorn-barred rock cross bred strain was employed because the other breed was not available. The chicks were obtained from two commercial hatcheries, but no marked differences in the response of the different chicks were apparent. In one experiment we employed the Hart, Kline, and Keenan (8) diet, which consisted of ground yellow corn 58, wheat middlings 25, casein 12, calcium carbonate 1, tribasic calcium phosphate 1, dried yeast 1, iodized salt 1, and corn oil 1. In the other experiments, 2 per cent. of the corn of this ration was replaced by 2 per cent. of dried yeast to make the diet contain a total of 3 per cent. yeast. The supplement was added with the 1 per cent. oil.

Our general procedure to determine the comparative response of the chicks to different sources of vitamin D was to feed doses of a standard, or reference cod liver oil, and the samples under study. Doses, which would give tibia ash contents between 34 and 42 per cent. ash, were used because it was believed that the most accurate comparisons could be obtained in this range. Fifteen to twenty chicks were placed in each group. One group of chicks in every experiment received no vitamin D and served as a negative control while another group received a dose of a reference cod liver oil and served as a positive control. The tests extended over four weeks, when the negative controls showed severe leg weakness. Ash determinations were made on the alcohol and ether extracted and moisture free left tibias. In some experiments the ash determinations were made on the individual bones, but in most cases the bones were pooled.

Table 2 contains the data of one of these experiments while table 3 contains a summary of all of our experiments. A standard curve was used for determining the figures contained in table 3. This curve was prepared from data obtained by feeding chicks a series of doses of cod liver oil. The rat units were the same as U. S. P. XI units. The chick units were determined by the following formula:

$$\frac{A}{B} \times \begin{matrix}\text{Theoretical U. S. P. XI units in dose of} \\ \text{reference.}\end{matrix} = \begin{matrix}\text{Chick units in the dose of} \\ \text{experimental sample.}\end{matrix}$$

A is the units in the dose of experimental sample and B is the units in the dose of reference sample; both values were obtained from the standard chick curve. This procedure allowed adjustment for the slight variations in different batches of chicks. These variations were not great. Groups, which received 20 U. S. P. XI units of vitamin D from the reference cod liver oil per 100 grams ration, varied between 38 and 42 per cent. ash.

Discussion

In general our results with the tuna liver oils confirm those reported by Bills (4). Six samples were tested, and they all appeared to be close to one-half, or slightly less active than cod liver oil for the chick, unit per unit. The difference is not as great as some reported by Bills, but he has recently reported that there was considerable variation in the tuna oils obtained from different sources. Per-

haps greater uniformity should be expected in our samples, because they all came from about the same locality.

This lower activity of tuna liver oil vitamin D is of considerable importance to the poultryman, and it shows him that rat unit values may be misleading. The chicken test must be insisted upon by these people. This slightly lower activity of tuna liver oil vitamin is of doubtful significance for the human, although this must be subjected to actual clinical trial. Experience with irradiated ergosterol indicated that the ability of the human to utilize this form of D agrees much more closely with that of the rat than the chicken. If a similar condition exists with tuna liver oils we would expect no detectable difference between the two sources of vitamin D for the human.

Our data showed little difference between different cod liver oils, halibut liver oil, swordfish liver oil and mackerel liver oil. Irradiated cholesterol vitamin D showed the same activity as these fish oils for the chicken, and the results were in close agreement with those of Waddell (19) and the others. In marked contrast, irradiated phytosterol or the unsaponifiable matter from alfalfa contained in vitamin D closely resembling irradiated ergosterol in activity. Similar results have recently been reported by Bethke, Record and Wilder (2). The presence of the irradiated ergosterol type of vitamin D in irradiated plant products, and the irradiated cholesterol type in irradiated animal products or on the skin after irradiation, suggests the possibility that the liver oils of animals which have access to the two forms of D may actually contain mixtures. Whether such a condition exists in the tuna, remains to be proven.

Summary

1. Blue fin, yellow fin and striped tuna liver oils contain a vitamin D or mixture of antirachitic vitamins which is definitely less active than the D from cod liver oil for the chicken. The samples, which were tested, appeared to be about one-half as active as cod liver oil, unit per unit.

2. Swordfish, halibut, mackerel and different cod liver oils appeared to contain vitamin D of about the same activity for the chicken. Irradiated cholesterol D was equal to that from these oils.

3. Irradiated phytosterol, or unsaponifiable matter from the plant product, alfalfa, compared closely to irradiated ergosterol for the chicken. These data confirm the recent report of Bethke and coworkers (2).

TABLE 1

FISH LIVER OILS AND VITAMIN D SOURCES

Number	Description	U. S. P. XI Units D per gram	Comments
965	U. S. P. Reference Cod liver oil	95	
1102	Cod liver oil	200	
1056	Cod liver oil	600	
1223	Cod liver oil	490	
1078	Halibut liver oil	1600	Contained some ling and block cod liver oil
1166	Halibut liver oil	1780	Contained some ling and black cod liver oil
1090	Mackerel liver oil	5000	From Japan—small sample
1120	Mackerel liver oil	6000	From Japan—small sample
1047	Swordfish liver oil	10300	Atlantic Coast
1037	Swordfish liver oil	4050	From Japan—small sample
1129	Blue fin tuna liver oil	33000	85% Japanese—15% America
1130	Blue fin tuna liver oil	57000	From Japan
1144	Blue fin tuna liver oil	42000	90% Japanese 10% American
1135	Yellow fin tuna liver oil	45000	From Japan
1132	Striped tuna liver oil	225000	From Japan—small sample
1080	Striped tuna liver oil	250000	From Japan—small sample
1057	Oil solution irradiated cholesterol	4950	From Acetol Products Co., New Brunswick, N. J.
1108	Oil solution irradiated phytosterol	250	Phytosterol prepared from corn oil
1140	Oil solution irradiated unsaponifiable of alfalfa	6500	
1153	Oil solution irradiated ergosterol	1200000	

TABLE 2

COMPARATIVE ANTIRACHITIC ACTIVITY OF VITAMIN D
From Cod Liver Oil and Blue Fin Tuna Liver Oil for the Chick

Lot No.	Vitamin D Supplement	U. S. P. XI Units D per 100 grams Ration	Average gain in weight in 4 weeks	Average % Ash in Tibia
40	Negative control	0	93	30.5
45	U. S. P. Reference cod liver oil	20	169	41.4
41	Cod liver oil #1223	15.3	163	39.5
42	Cod liver oil #1223	30.6	192	44.6
43	Cod liver oil #1223	61.2	195	45.3
44	Cod liver oil #1223	122.4	195	46.1
46	Blue fin tuna liver oil #1144	30.3	152	37.6
47	Blue fin tuna liver oil #1144	60.5	173	44.0
48	Blue fin tuna liver oil #1144	121.1	195	45.4
49	Blue fin tuna liver oil #1144	242.2	212	46.0

TABLE 3

COMPARATIVE ACTIVITY OF VITAMIN D
From Various Sources for the Chick and Rat

Sample Number	Source of Vitamin D	Rat Units D in dose fed	Chick Units D in dose fed	Ratio Chick Units / Rat Units
1102	Cod liver oil	20	16	.8
1056	Cod liver oil	20	20.6	1.03
1223	Cod liver oil	15.3	16.2	1.06
	Cod liver oil	30.6	29	.94-1.00 Ave.
1078	Halibut liver oil	20	19.2	.96
1166	Halibut liver oil	20	18.0	.9
1047	Swordfish liver oil	20	20.8	1.04
1037	Swordfish liver oil	20	19.2	.96
1090	Mackerel liver oil	20	*	Probably close to 1
1120	Mackerel liver oil	20	22.6	1.13
1129	Blue fin tuna liver oil	12	6	.5
	Blue fin tuna liver oil	30	15.5	.52
	Blue fin tuna liver oil	60	30.4	.51 .51 Ave.
1130	Blue fin tuna liver oil	20	8	.4
	Blue fin tuna liver oil	40	16	.4 .4 Ave.
1144	Blue fin tuna liver oil	30	14.9	.49
	Blue fin tuna liver oil	60	31.0	.51
	Blue fin tuna liver oil	30.3	13.2	.43
	Blue fin tuna liver oil	60.6	27.0	.46 .47 Ave.

*This sample was tested without a reference group, but the ash percentage was as high as given by 20 units of reference oil in other experiments.

Sample Number	Source of Vitamin D	Rat Units D in dose fed	Chick Units D in dose fed	Ratio Chick Units Rat Units
1135	Yellow fin tuna liver oil	20	12.6	.63
1080	Striped tuna liver oil	50	**	More than .4
1132	Striped tuna liver oil	20	9.4	.47
	Striped tuna liver oil	40	18.2	.45 .46 Ave.
1057	Irradiated cholesterol	20	20	1
1108	Irradiated phytosterol	20	Dose too low	Per cent. ash same as negative group
1140	Irradiated unsaponifiable of alfalfa	20	Dose too low	
		400	20.8	.052
1153	Irradiated ergosterol	400	16.8	.041

**The ash content of the bones was too high to accurately measure the units from the curve.

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THE ONE HUNDRED AND FOURTEENTH ANNUAL COMMENCEMENT OF THE PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE

THE one hundred and fourteenth annual commencement of the Philadelphia College of Pharmacy and Science was held at the College, Wednesday evening, June 3, 1936. Three men prominent in Pharmacy received honorary degrees. They are as follows: Professor Edward Spease, Dean of the School of Pharmacy of Western Reserve University, Cleveland, who delivered the annual address to the graduates, an address which is printed elsewhere in this issue; Irwin A. Becker, a former graduate of the College (1896), chief pharmacist of the Michael Reese Hospital in Chicago, and a diligent worker in the field of professional pharmacy, and Dr. Adley B. Nichols, a graduate of the class of 1917, assistant professor in pharmacy at his alma mater, and secretary of the National Formulary Sixth Revision Committee.

In addition to these honorary degrees, 102 degrees in course were conferred upon students from many parts of the United States. Degrees this year were granted in bacteriology, biology, chemistry and pharmacy.

Two students received the degree of doctor of science in biology and two in bacteriology. The degree of master of science was conferred upon seven students in chemistry, two in biology, one in bacteriology and one in pharmacy.

Seventy-one students received the degree of bachelor of science in pharmacy, three the bachelor of science degree in bacteriology, two the bachelor of science degree in biology, and eleven students the degree of bachelor of science in chemistry.

The degrees conferred in course were as follows:

DOCTOR OF SCIENCE IN BIOLOGY

John Hampton Hoch
Paul Alvin Mattis

DOCTOR OF SCIENCE IN BACTERIOLOGY

Francis Cornelius Lawler
John Neumann McDonnell

MASTER OF SCIENCE IN CHEMISTRY

William Frederick Happish, Jr.
Arnold Koff
Charles Clifton Pines
Louis Alexander Reber
Philip Rubenfein
Frederick Walter Schreiber
Raymond Steiner

MASTER OF SCIENCE IN BACTERIOLOGY

George Mohlivere Eisenberg

MASTER OF SCIENCE IN BIOLOGY

Bernard Melkon
Martin Sylvester Ulan

MASTER OF SCIENCE IN PHARMACY

Paul Wilcox

BACHELOR OF SCIENCE IN CHEMISTRY

Morris Eli Blatman
Earl Martin Chamberlin
William Elliott Cuff
Philip Fischer
Robert Hormby Gilbert
Walter Sheridan Gilbert
Tony Michael Immediata
Joseph Frank Oakley
Abraham Spevack
Robert Disraeli Spiers
Floyd Todd

BACHELOR OF SCIENCE IN BACTERIOLOGY

Florence May Katz
Marie Emily Ranere
May Beach Troth

BACHELOR OF SCIENCE IN BIOLOGY

Albert Risley Cattell
Manuel Raubfogel

BACHELOR OF SCIENCE IN PHARMACY

Nicholas Bakaysa
Alec Barbacoff
Ernest Gregory Barbieri
Ruth Ella Barnett
Harry Ellicott Beale, Jr.
Isadore Brosbe
John Francis Brown
Aloysius Burns
Reynold Richard Clouse
Leonard Solomon Cohen
William Crescenta, Jr.
Charles Titus Croney
Rudolph DeCerchio
Robert John Deckert
Andrew Vito Dinoto
Seymour Fox
Charles Hoffman Fretz
Solomon Isaac Gadol
Benedicta Leone Ginkiewicz
David Grodanz
Martin Grossman
Stanley Morton Haaz
Joe Matthews Hamilton
Arnold Sewell Harris
Henry Markel Hays
Jack Saul Hedrick
William James Heginbothom
Louis Charles Hengy, Jr.
Louis Hirsh
John McCormick Hodges
Bernard Harry Horvitz
Cyril Taliesen Jenkins
Robert Jenkins
Mildred Lenore Kazec
Aloysius George Konizer
Maurice Kramaroff
John Eichholtz Kramer
Sidney Lavine
Samuel Levin
Willard Christian Loper
George Love
Hugo Melchiorre
Michael Stephen Mikulski
Philip Harry Millman
Frank Anthony Morinelli
John Joseph Murma
Pasquale Camillo Nasuti
Joseph August Nussle
Albert John Obert
Wanda Eleanor Olszewski

Armand Joseph Ottaviani
Luther Wesley Parnell
Herbert Aaron Powell
Alphonse Michael Redicka
William Richmond
Louis Johnson Ringer, Jr.
Morton Rosenfeld
Philip Samuels
Fred Anthony Sassi
Edward Segal
Stephen Everette Simmons
Matilda Rita Sirianni
Sister Mary Leonore
Sister Mary Paul
Richard James Swoboda
Lewis Edward Valley
Alfred Wacks
Nellie Perry Watts
Listervelt Sylvester Winfree
Paul Robert Wolfgang
Thomas Austin Young

CANDIDATES WHO HAVE COMPLETED SPECIAL COURSES AND HAVE QUALIFED FOR CERTIFICATES

(This does not include students who completed courses in these subjects for credits for a degree)

For Certificates in Bacteriology

Jean Brown
Dorothy Vivian Strunk
Lois Eleanore Levyn
Mildred Myers
Miriam Goodman

For Certificates in Clinical Chemistry

Jean Brown
Dorothy Vivian Strunk
Lois Eleanore Levyn
Mildred Myers
Samuel Israel Masters

Award of Prizes 1936

Designated as "Distinguished"
With General Average Over 90%

Bachelor of Science in Pharmacy

Reynold Richard Clouse
Charles Hoffman Fretz
Jack Hedrick
Philip Harry Millman
Nellie Perry Watts

Bachelor of Science in Bacteriology

Florence Mary Katz

Bachelor of Science in Chemistry

Tony Michael Immediata

Designated as "Meritorious"
With General Average Between 87% and 90%

Bachelor of Science in Pharmacy

Seymour Fox
Joseph August Nussle
Albert John Obert
Sister Mary Paul

BACHELOR OF SCIENCE IN CHEMISTRY

Earl Martin Chamberlin — Philip Fischer
Floyd Todd

The PROCTER PRIZE, a gold medal awarded on the basis of a competitive examination to which are eligible B. Sc. candidates in Pharmacy who are designated as distinguished, and candidates who are designated as meritorious. Earned by:

NELLIE PERRY WATTS

Honorable Mention to

Reynold Richard Clouse — Seymour Fox
Joseph August Nussle

The FRANK GIBBS RYAN PRIZE, a gold medal endowed by the Class of 1884, as a memorial to their distinguished classmate, for the best average in the Chemical and Pharmaceutical Laboratory Courses, is awarded to:

NELLIE PERRY WATTS

Honorable Mention to

Reynold Richard Clouse — Jack Hedrick
Robert John Deckert — Michael Stephen Mikulski
Charles Hoffman Fretz — Sister Mary Paul
Henry Markel Hays — Richard James Swoboda

The WILLIAM B. WEBB MEMORIAL PRIZE, twenty dollars and a bronze medal for the highest average in branches of Operative Pharmacy, Analytical Chemistry and Pharmacognosy, is awarded to:

NELLIE PERRY WATTS

Honorable Mention to

Reynold Richard Clouse — Jack Hedrick
Charles Hoffman Fretz — Sister Mary Paul

The FREDERICK WILLIAM HAUSSMANN MEMORIAL PRIZE of one hundred dollars, given to the Pharmacy student with the highest average for the last three years of the course, is awarded to:

NELLIE PERRY WATTS

Honorable Mention to

Charles Hoffman Fretz — Joseph August Nussle
Jack Hedrick — Sister Mary Paul

The LAMBDA KAPPA SIGMA PRIZE, for members of the sorority who average at least "A" in four years:

FLORENCE MAY KATZ — NELLIE PERRY WATTS

A prize of twenty-five dollars offered by THE WOMEN'S AUXILIARY OF THE DAUPHIN COUNTY PHARMACEUTICAL ASSOCIATION to the girl graduating with the highest average:

NELLIE PERRY WATTS

Gold Medals awarded by the Alumni Association to the student of the B. Sc. Class in Pharmacy and to the student of the B. Sc. Class in Chemistry, in Bacteriology, or in Biology, who attain the highest scholastic averages, are awarded to:

B. Sc. in Pharmacy .....NELLIE PERRY WATTS
B. Sc. in Bacteriology .....FLORENCE MAY KATZ

The REMINGTON MEMORIAL PRIZE, twenty dollars, offered by the Estate of Joseph P. Remington, for the highest average in the examination of Operative Pharmacy and Dispensing, is awarded to:

NELLIE PERRY WATTS

Honorable Mention to

Reynold Richard Clouse
Charles Hoffman Fretz
Jack Hedrick
Albert John Obert
Sister Mary Paul

The MAHLON N. KLINE THEORETICAL PHARMACY PRIZE, fifty dollars in cash, offered by the Mahlon N. Kline Estate, for the highest average in Theory and Practice in Pharmacy, is awarded to:

NELLIE PERRY WATTS

Honorable Mention to

Aloysius Burns
Robert John Deckert
Charles Hoffman Fretz
Jack Hedrick
Joseph August Nussle

Iodized Salt—A Food or a Drug?

The ill effects of iodized salt are double—whether it contains 1/50 or 1/100 of 1 per cent. of iodine—those upon persons having hyper-thyroidism and those upon persons who are normal. Ill effects upon the first group we leave to the medical profession. Confining attention to the second group, since the problem here concerns populations, we have a few remarks to add. If Johnnie or Jane needs a dose of medicine during adolescence there seems to be no good reason why Father and Mother and Sister and Brother, and even Grandpa and Grandma, should take the same dose, particularly when danger attends the use of it because of its insidious effects. Too little is yet known to warrant a shot-gun procedure. Some States may be accused of dosing everybody with a medicine about which little is known, for a disease about which less is known, through the agency of some who may know little or who easily disregard what others thus far have learned.

SCIENTIFIC AND TECHNICAL ABSTRACTS

Compiled by Linwood F. Tice, M. Sc.

Detection and Determination of Mercury. C. Mahr, *Z. anal. Chim. 104,* 241 (1936), through Analyst *61,* 359 (1936). The method presented depends upon the use of ammonium tetrathiocyanato-diammine-chromiate ("Reinecke's salt") which produces a voluminous pale-red precipitate, Hg $[(CNS)_4\ Cr\ (NH_3)_2]$ with mercuric salts in 0.1 n. hydrochloric acid solution. The reaction is extremely sensitive; 2.5 γ of mercury can be detected in 5 cc. after 2 minutes' standing. The only other metals precipitated by the reagent from acid solution are gold, silver and thallium; other metals do not interfere. For a quantitative determination the solution, which may contain moderate amounts of nitric, sulfuric, acetic or tartaric acid, is treated with hydrochloric acid to 0.5 n. concentration and heated almost to boiling on a steam bath in a covered beaker. The mercury concentration should not exceed 0.02 gm. per 100 cc. and with more than 0.05 gm. of the metal the precipitate is inconveniently bulky. The solution is treated, drop by drop, with a fresh, filtered, slightly acid solution of the reagent (0.05 gm. per 0.01 gm. of metal) after a few minutes the beaker is removed from the heat, allowed to stand for 5 minutes and the precipitate collected in a sintered glass crucible and thoroughly washed with hot water. The precipitate may now either be determined by a volumetric or a gravimetric procedure. The volumetric method consists in dissolving the precipitate with the aid of 0.2-0.3 gm. of potassium cyanide in hot water, the filtrate being received in a 400 cc. conical flask. Any chromic hydroxide that separates is dissolved in a little n. hydrochloric acid and the crucible is well rinsed and discarded. The filtrate is diluted to 100-250 cc., according to the amount of mercury, treated with 3-7 cc. of concentrated sulfuric acid and 2-3 gm. of potassium bromate and boiled for 15 minutes. This oxidation to chromic acid is promoted by the addition of a drop of nickel nitrate solution. The excess bromate is then destroyed by boiling for 20 minutes with the addition of 5-7 gm. of ammonium sulfate and 5-6 cc. of n. hydrochloric acid. A current of CO_2 may be used to expedite the removal of the bromine. The original volume is maintained during the boiling by the

addition of water. Finally the cooled solution is treated with 2-3 gm. of potassium iodide and the liberated iodine titrated with sodium thiosulfate each cc. n/10 solution = 0.0033435 gm. Hg. In the gravimetric procedure the precipitate is washed with water, then alcohol, and dried for 1½ hours at 105-110°C. It contains 23.96 per cent. of mercury. With large amounts, the results may show a positive error of 0.5-1.0 per cent. Ignition of the precipitate to chromic oxide, however, gives correct results. This latter step is recommended for quantities exceeding 0.05 gm. the precipitate being collected on a paper or a porous porcelain filter. The conversion factor for Cr_2O_3 to Hg is 1.3196.

The Assay of Chlorcresol Soap Solutions. B. Stempel. *Pharm. Zentr. 74,* 329 (1936). Disinfectants consisting of soap solutions of chlorcresol are frequently used in various hospitals. The author presents a method of assay that involves three steps namely:

1. The separation of chlorcresol from the soap by distillation with super-heated steam.

2. Separation of chlorcresol from the distillate by ether extraction.

3. The determination of chlorcresol by catalytic hydrogenation.

The method is as follows: About 10 gm. of the chlorcresol solution, exactly weighed, is placed in a 300 cc. Jena flask and 10 cc. of a solution of calcium chloride and 20 gm. of sodium chloride added. The mixture is then subjected to steam distillation with superheated steam, the distillation flask being heated during the process with a small flame. About 500 cc. of distillate is collected and the completion of distillation tested with bromine water. The distillate is now extracted with ether for six hours in an extraction apparatus. The determination of chlorine in the extracted chlorcresol is made through the catalytic reduction method of Busch and Stöwe (*Ztschr. angew. Chem. 27,* 432 (1914). The etherial solution is placed in a 200 cc. flask, the most of the ether distilled off, 30 cc. of ethyl alcohol, 10 cc. of 10 per cent. pure colorless alcoholic potash and 3 gm. of palladium treated calcium carbonate are added.

Ten drops of hydrazine hydrate "analytical grade" are next added and the mixture heated on a water bath with a reflux condenser for 2 hours. The catalyst is then filtered out and washed with alcohol and distilled water until the washings no longer give a chloride reaction. The filtrate is next freed of alcohol by heating, acidulated with nitric acid and the chloride precipitated by silver nitrate. The silver chloride is collected in a weighed Gooch crucible washed with hot alcohol and water and dried in the usual manner.

The amount of chlorcresol present in the sample is given by the formula

$$\% \text{ parachlormetacresol} = \frac{\text{wt. Ag. Cl. x } 99.46}{\text{wt. sample}}$$

The catalyst used in the process is prepared as follows: 50 gm. of freshly prepared calcium carbonate is suspended in water, a solution of 0.85 gm. of palladous chloride dropped in and the liquid warmed on a water bath with frequent shaking until the supernatant solution has become colorless. The carbonate which is now brown in color due to palladium hydroxide is washed on a suction filter until it is free of chloride and then dried in pure air on a desiccator over sulfuric acid.

If the chlorcresol solution does not contain any volatile substances other than chlorcresol it may be determined by simply driving off the ether from the ether extract and weighing the residue after drying it over calcium chloride in a desiccator for twelve hours.

The Physical Properties of the Ternary System—Ethyl Alcohol —Glycerin—Water. R. C. Ernst, C. H. Watkins and H. H. Ruwe. *J. Physical Chem. 40,* 627 (1936). These authors working with the ternary system alcohol—glycerin—water have varied the components of this system and plotted curves showing the variation in density, surface tension, viscosity, refractive index and specific heat.

Binoidal curves are presented in which the composition of the sample is represented on the abscissa versus the particular property under consideration as the ordinate. From these curves triangular diagrams giving constant property lines were prepared.

Workers interested in the physical properties of mixtures of these three substances will find this paper of value.

Report on Preservatives. J. C. Krantz, *J. A. O. A. C., 19,* 205 (1936). The results of Jensen and Orner (Dansk. Tids. Farm. *8,* 233 (1934) are summarized. These authors studied the relative efficacy of preservatives on various foodstuffs. The organisms employed were: *Saccharamyces Pastorianus, S. apiculatus, Torula alba, T. rubra, Aspergillus glaucus, A. flavus, A. niger, A. fumigatus, Penicillium glaucum, Citromyces pfefferianus, Cladosporium herbarum, Dematium pullulans, Mucor racemosus, M. mucedo,* and *Rhizopus nigricans.* It was observed that, of the organisms collected from the air in July, 75 per cent. were molds and only 25 per cent. bacteria, the majority of the latter being saprophytic. Forms of Penicillium and Citromyces are the most common, followed by Aspergillus and sometimes mucor.

Using various preservatives the following results were obtained showing the greatest dilution at which the growth of all the organisms was prevented:

	Greatest effective dilution	Previously determined dilutions for bacteria
Sodium benzoate	50	100
Methyl p-hydroxybenzoate	200	450
Euquinine	300	150
Ethyl p-hydroxybenzoate sodium	400	...
Prophyl hydroxybenzoate sodium	500	500
Prophyl p-hydroxybenzoate	700	800
Benzoic acid	900	100
Trypaflavin	1500	3000
Benzyl p-hydroxybenzoate sodium	1700	1000
Methylene blue	2000	5000
Hexylresorcinol	2500	1500
Rivanol	2500	2500
Chinosol	3000	2000
Methyl violet	3500	9000
Brilliant green	3500	6000
Malachite green	5000	3000

The series obtained for the dilutions which killed in forty-eight hours was very similar. The results were affected to a great extent by the nature of the substrate.

A Micro-Method for the Quantitative Determination of Hydrocyanic Acid Compounds in Medicinal Products. G. A. Weissman. *Pharm. Zentr. 77,* 361 (1936). There are several medicinal substances which contain as one of their important components cyanide or oxycyanide compounds. The amounts and concentration of these substances in medicinal products is usually so insignificant that ordinarily it is impossible to quantitatively evaluate the amount present.

Obviously, even though the amount of cyanide may be very small in a preparation, it is extremely poisonous and its amount should be accurately determined.

The literature describes methods for the quantitative determination of small amounts of hydrocyanic acid; Kolthof's colorimetric hydrocyanic acid determination as thiocyanate; Smith's colorimetric method with picric acid; the nephelometric method; and the volumetric method of Schulek.

None of the above methods were found appropriate for the determination of small amounts of cyanide except that of Schulek. This method was chosen and extended in the following manner to cover other types of products.

Schulek's method consists in placing 20 tablets with a $Hg(CN)_2$ content of about 0.2 mg. in a 100 cc. volumetric flask with 5 cc. of 2 n. H_2SO_4 and 50 cc. of water added. After complete disintegration of the tablets water is added to the mark and 50 cc. of the filtered material poured into a 250 cc. flask with a ground-glass stopper. 5 cc. of 20 per cent. H_3PO_4, 1 cc. of bromine water and 1 gm. of Na Cl are added and the mixture allowed to stand 10 minutes. Then 2 cc. of a 5 per cent. phenol solution is added, the mixture shaken vigorously and 0.5 gm. of KI added. It is then placed in the dark for 10-15 minutes and the liberated iodine titrated with 0.01 n. thiosulfate using starch as the indicator. Each cc. of 0.01 n. $Na_2S_2O_3$ corresponds to 0.000631 gm. $Hg(CN)_2$. Phenol is used for the purpose of binding the excess bromine.

This method is also satisfactory for the quantitative determination of mercuric oxycyanide and bitter almond water, both alone and also in medicinal products. Mercuric oxycyanide may be determined as mercuric cyanide in which case 1 cc. of 0.1 n. $Na_2S_2O_3$ corresponds to 0.001173 gm. HgO. $Hg(CN)_2$.

In the case of bitter almond water the free hydrocyanic acid is determined exactly as given above for mercuric cyanide. One takes a sample of at least 0.5 gm. The quantitative determination

of the bound hydrocyanic acid in bitter almond water is determined in the following manner. A sample (0.2-0.3 gm.) in a glass-stoppered flask is treated with 5 cc. of 1 n. NaOH and the mixture heated on a water bath for 5 minutes. After cooling 50 cc. of water and 6 cc. of 20 per cent. H_3PO_4 are added and then one proceeds as already described for $Hg(CN)_2$.

For the quantitative determination of bitter almond water in medicinal mixtures in the presence of infusions and tinctures one proceeds as follows: A sample of the product containing at least 0.3 gm. of bitter almond water is placed in a 500 cc. flask, 5 cc. of 1 n. NaOH added and the mixture evaporated on a boiling water bath to 2-3 cc. After cooling the flask is connected for distillation and a Liebig condenser attached with the delivery end of the condenser connected to a rubber tube which is immersed to the bottom of an absorption flask of about 200-250 cc. capacity. In this absorption flask is placed 25 cc. of a 0.2 n. NaOH. 50-60 cc. of a 3 per cent. H_3PO_4 are poured in the first flask and the HCN driven over into the receiver by heating on a sand bath for 15-30 minutes or until the volume of liquid in the receiver is doubled. The hydrocyanic acid collected in this manner in the receiver is now determined by the method already given. Each cc. of .01 n. $Na_2S_2O_3$ = 0.000135 gm. HCN. The amount of HCN found, multiplied by 1000, gives the amount of bitter almond water in grams in the product.

Experimental results have shown that as little as 0.1 mg. of HCN may be determined, the assay requiring only 30-40 minutes.

Short Circuit

I slide a pair of glasses on my funny nose
And glide this point of graphite over cellulose.*
I see—I feel—I stand—I kneel—I toe—I heel—I squirm—I squeal;
I think—though this may not suggest it,
I chew my food, and then digest it.
In short—my cells—coherent and coordinate,
Are to some subtle force subordinate,
And every atom of my protoplasmic mess
Is tightly bound by this electric stress.

Which after three score years of going round
Eventually finds a proper ground,
Or, if for pyrotechnics I've a flair
With all my current gone, I'll get the air!

I. G.

*Explained by the fact that the original was pencilled on paper.

SOLID EXTRACTS

By Ivor Griffith, Ph. M., Sc. D.

Cornell savants have recently expressed the opinion that the acceleration of senility in the animal can be repressed by a careful supervision of the diet. A sort of an alphabet soup, with the vitamins swimming about with poetic indifference, and a careful policing of the calcium and magnesium intake, seem to be the outstanding recommendations of these dining room doctors. With such a diet they promise rubber arteries that bend with nary a crack, and a brain that bats a hundred, until the long day is done.

Well! so long as we would rather let the grass grow under our feet than over our heads, this should be an encouraging comment—but more than likely most of us will prefer to continue carrying on as refrigerator robbers and kitchen cleaners-up.

"Where do we go from here boys?" is at last answered by science—or at least by the *Scientific Monthly*. No one, states Dr. Dushman, writing therein, has pointed this out "more clearly than has Bridgman"—and this is how Bridgman bridges the gap and voices the void.

> "Furthermore, if we remember that the operations to which a physical concept are equivalent are actual physical operations, the concepts can be defined only in the range of actual experiment, and are undefined and meaningless in regions as yet untouched by experiment. It follows that strictly speaking we cannot make statements at all about regions as yet untouched, and that when we do make such statements, as we inevitably shall, we are making a conventionalized extrapolation, of the looseness of which we must be fully conscious, and the justification of which is in the experiment of the future."

All of which means that nothing is final while it lasts, and that the only permanent thing on earth is the thing called change.

Let us altogether sing, with Omar—

> Myself when young did eagerly frequent
> Doctor and Saint, and heard great argument
> About it and about; but evermore
> Came out by the same door wherein I went.

Altitude is now said to affect the rate of evacuation in the human stomach. Hawk (the tennissing physiologist) who has also studied the gastric racket, gives these figures representing the evacuation time of standard foods by a normal stomach (approximately ¼ pound of food) and without regard for altitude.

Trout and Rice	1.50	hours	and	minutes
Bread, Milk and Eggs	2.30	"	"	"
Beefsteak and Potatoes	3.30	"	"	"
Vealsteak	4.00	"	"	"
Beefsteak	5.30	"	"	"
Fried Duck	6.30	"	"	"
Sardines in Oil	8.00	"	"	"

But according to a recent speaker, fifty per cent. more time is required to empty a stomach at Pike's Peak than at sea level—a statement which could only have come from a lumbering land-lubber. For at sea level—even a few leagues from shore—stomachs are frequently emptied (perpendicularly) in jig-time, irrespective of what food they might have held. But why bring that matter up now?*

Said someone on the radio not so very long ago:

"Comfort during hot weather is due in no small part to a complacent mental attitude. A philosophical state of mind, freedom from worry and inclination to benefit as much as possible by the respite from ordinary duties are all conducive to health and happiness. When an unruffled state of mind is coupled with reasonable observance of hygienic principles a winning combination results."

And while there is much that is sound in the above—as advice—it reads more like the soulful testimony of a boondoggler, whatever that is—especially that part which reads "the respite from ordinary duties."

In a semi-scientific periodical—so dubbed because the other half is made up of stuff scissored from uncensored sources, we are definitely informed that—

"The entire human race could be wiped off the face of the earth with only sixty pounds of the toxin which causes the deadly food-poisoning known as botulism."

*1936 Meeting, Feder. Amer. Soc. Exper. Biol., Washington, D. C.

In the first place—and in the interest of scientific accuracy—what is the population of the earth? What it is this instant, it was not, an instant ago, nor will be, an instant hence!

But roughly speaking it is said to be somewhere in the neighborhood of two billion, including the three or four dictators who, in assorted parts of the universe, have assumed the role of the broad-lapped gods of Olympus.

By approximate calculation we note that one grain of the aforementioned toxin would "wipe off the earth" five thousand of the parasitic bipeds called men—which is sheer nonsense!

And furthermore why punish two billion with this botulous bane, not for the sins of the snake-tricked pair, but for the crimes of a queer quartette which now seeks to bully the billions?

Leprosy—the age old curse of the race—may have had too lurid and defamatory a description in the hand-book of Christianity, the Bible, for despite its relative non-contagiousness, it is still regarded as the unspeakable filthy disease. According to an authority on the subject—Dr. Perry Burgess—

"It is generally accepted that there are not less than three million lepers in the world, and if we were able to detect all those in early stages the number probably would be much greater. Of the positive cases in institutions probably about 50 per cent. are incapacitated for work, and a pitiful handicap is placed on the others, since with a few exceptions the products of the leper's toil has no market. No well person wants that which his leprous hands may produce."

In other words the leper's lot is an unlovely lot, a loathsome, left-to-die lot—except for the fact that well-meaning governments, for safety's sake, are doing their bit to corral the unfortunates.

Leprosy has practically disappeared from Europe, although, in the fourteenth century, that continent boasted not less than 2000 homes for lepers.

"Cheese it!"—here comes a compliment—to the cheesemaker's art, and from one who chooses his cheese—not from a flying trapeze,

but from the Bureau of Dairy Industry (U. S.). Dr. L. A. Rogers speaking:

"One of the finest examples of how an art may, by rule of thumb methods, develop a control of complicated biological forces is found in the practices of the cheese maker. If a large vat of milk could be divided among five cheese makers from five different nations, we could obtain five types of cheese differing radically in their appearance, physical properties and flavor.

"If the cheese maker were English, he would probably make a firm-bodied, mild-flavored Cheddar; if he were from Holland he would make his part of the milk into Edam or perhaps Limburger with its high flavor and odor; an Italian would probably make a hard, dry Parmesan with small round holes, requiring two years to develop its sharp flavor; a cheese maker from Southern France would make his milk into Roquefort, a cheese with a piquant flavor and a white curd mottled with blue-green mold; and if the cheese maker came from Switzerland he would certainly convert his milk into a big Emmental or Sweitzer, puffed up with gas holes, and with a rubbery texture and a peculiar sweetish flavor."

And, we hasten to add, that if the cheesemaker came from the Bronx, he could make any or all of these cheeses—or make them all at once—conjoining the firmness of Cheddar, the malodor of Edam, the sharpness of Parmesan, the rot in the Roquefort, and the holes in the Sweitzer—bigger and better than ever before. Moreover he could make them on Tuesday and sell them the next day.

And again—preceded by a Bronx cheer—we say—"Cheese it!"

And since we are on the subject of cheese—did you know that—

Real Roquefort cheese is made from goats' milk?

Well, it is not!—it is made from sheep's milk, and the green streaks of the mold follow the course of steel-wire holes made in the original mass—or mess.

And speaking of Sweitzer cheese, did you know that to insure a good Swiss cheese it is necessary to bring about a succession of bacterial fermentations produced by different kinds of bacteria, each one taking up its work at the proper stage and supplementing what has been done by its predecessors.

If the fermentation has progressed properly the "eyes" (or holes which are the chief diagnostic factors in Swiss cheese) are uniform in size and appearance, evenly distributed, and neither too large nor too small. If the eyes are right, it is almost certain that the flavor will be satisfactory. Consequently, Swiss cheeses are graded and the price determined by the appearance of the eyes.

By the way only a man of more than ordinary physique and constitution can withstand the hard work and long hours required in the operation of a Swiss cheese factory. His work begins in the early morning hours and extends well into the night. Between the actual making periods there are long rows of 175-pound cheeses to be taken from shelves, turned over and put back. It is related that cheese makers going through this routine, and having an unoccupied hour in the middle of the day, spend most of it in working with 50-pound dumbbells "to keep themselves in good condition."

Well—college professors work nearly all day, with dumbbells—ranging from 100 to 150 pounds, and often with no results!

Grandmother's Herbs

"In a mad scramble to squeeze out of the coal tar barrel every available virtue, research has neglected the botanicals.

The temporary and spectacular successes of surgery, the over-zealous and frequently illogical zoological fads and the over-emphasized phase of bacterial medicaments, all have turned our eyes away from medicinal plant possibilities.

Our heads have been dizzied with serums, endocrines, vaccines, surgical tricks—ectomy this—otomy that—transfusions, infusions, delusions—adjustments, psychopaths, allopaths, neuropaths, homeopaths, and several other paths—and a few detours.

Yet I am certain that when research turns—and turns intelligently to an evaluation of the long since discarded commonplace drugs of the countryside, there will be found many valuable agents of therapy.

No one can convince this writer that grandmother's fresh drug infusions or old-fashioned teas of garden herbs, had no especial value. Too much neglected have been sage and chamomile, boneset and mullein, bitter apple and horse nettles, plantain and heal-all, liverwort and tansy, pumpkin seed and mallow—and a host of other herbs and parts of herbs that have served the countryside for centuries with their healing ministrations."—(I. G.—*Pop. Sc. Talks.*)

BOOK REVIEW

Handbuch der Pharmakognosie

The well-known monumental handbook of pharmacognosy of Tschirch is now being published in the second enlarged edition. This second volume, dealing with the description of individual drugs, was released in January as issue No. 18, printed in German, by the publisher Tauchnitz, of Leipzig. The cost is slightly above two dollars.

Dr. Casparis, successor to Dr. Tschirch as Director of the Pharmaceutical Institute in Bern, has assumed the editorship and the revision of the pharmaco-chemistry. He is assisted in the general revision by Drs. Tschirch, of Bern, and Lippmann, of Halle. Dr. Tschirch assumed the revision of the synonyms and history of drugs; Drs. Flueck, of Zurich, and Himmelbaur, of Vienna, that of the botanical facts, including collecting.

Dr. Lingelsheim, of Breslau, is responsible for the discussion of admixtures, substitutes and adulterations; Dr. Marzell, Gunzenhausen, for that of the German nomenclature. Dr. Kofler, Innsbruck, edits the analytical and microchemical data and facts concerning the effect and uses of drugs, and Dr. Fischer, Bern, contributes the revision of their plant pests.

The general arrangement of facts, as well as the unique division, based on the chemical nature of constituents, is maintained. The co-operation of a staff of experts in their respective fields, who sign their individual contributions, assures the perfection and speedy completion, so much desired by the original renowned author.

It must, indeed, be gratifying to both Dr. Tschirch and the publisher that this master reference work of monographs is to be kept up to date. It thus will not only maintain but increase its popularity among all those interested in any of the problems connected with scientific as well as applied pharmacognosy, and the knowledge of drugs and drug plants.

ARNO VIEHOEVER.